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ABSTRACT

Participation by Wilkes College in the Pennsylvania Regional Instructional System for Education (PRISE) Regional Cooperative Computing Activities program for the period July 1971 through June 1974 is summarized, and problems and successes identified. Loss of faculty members trained in the program and loss of interest of some of the others because of time and effort required in computer use are listed as obstacles. Development of a solid core of computing-oriented faculty members is identified as a success. The advantages of introducing interactive computing to students is also cited. (SK)

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Pennsylvania Regional Instructional System for Education

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During the period from July, 1971 through June, 1974, Wilkes College participated in the Pennsylvania Regional Instructional System for Education (PRISE) in the Regional Cooperative Computing Activities Program sponsored by the Pennsylvania Department of Education. Three regional networks took part in PRISE. Wilkes College was associated with the Lehigh Valley Regional Computing Network in which Lehigh University was the lead institution. In partial support of the program, a grant was awarded to Wilkes College, among the other institutions of the three regional networks, by the National Science Foundation, Office of Computing Activities.

The purpose of PRISE was to develop computing skills among the faculty of colleges where large-scale computing facilities were not readily available. The facilities were to be provided through communications networks by institutions with well-established computing centers. These institutions were to provide leadership and instruction for the participating faculty members at the various member institutions on the networks.

The overall plan for PRISE called for the participating faculty to attend two summer workshops on computing conducted by the lead institutions of the regional networks in 1971 and 1972. During the academic years 1971-72 and 1972-73, the participants were expected to apply computing concepts and techniques in some way to instruction

in their various disciplines. Toward this end, the participating institutions were committed to releasing the faculty participants from part of their normal duties to give them time to develop some instructional applications of computing for their own use and that of their colleagues. Low speed terminals were to be placed in the participating institutions in order to provide access to the computing facilities of the lead institutions in their respective regions.

Each of the participating institutions submitted its plan outlining how the resources of the network would be applied toward the development of academic computing capabilities within its own special environment. The Wilkes College plan defined five goals toward which we hoped to make progress in the course of the PRISE program. Stated briefly, our goals were: (1) computer assisted instruction capability, (2) problem solving capability, (3) an expanded data processing curriculum, (4) computer simulation as a laboratory tool, and (5) faculty and student development of original application of computers.

Wilkes College had already committed itself to the above goals by the formation of its own computer center and the acquisition of a small scale computer: a Honeywell 115 with 24 k characters of memory, a card reader/punch, a printer, and two 9-million character disk storage units. The computer center's resources were apportioned 50 percent for academic purposes and 50 percent for administrative functions.

PRISE activities began with a summer session at Lehigh University attended by three of our faculty members who had varied academic backgrounds and no prior computing experience. When these participants returned to our campus they brought with them the information processing knowledge and programming skills that they had acquired during the summer. At this point, the participants had no firm ideas on how they were going to apply their newly acquired skills to their classrooms and laboratories. A period of groping and experimentation consumed most of the fall semester of 1972. During this time the participants sharpened their programming technique and passed along some of their skills to receptive students and faculty members.

One of the participating faculty incorporated the use of the computer in an advanced Materials Engineering course. His students were taught the fundamentals of FORTRAN programming and encouraged to develop computer solutions for some microprobe analysis problems. The most significant result of these efforts was not in the computer programs that were developed, but in the appreciation of the algorithmic approach to problem solving that the students gained in their attempts to design solutions to complex problems. The students also acquired enough computer programming skill to be able to apply the computer to problems in other areas of study, and those students were observed making use of the computing facility beyond the course

work and after the conclusion of the course.

Another participant chose to propagate his computing knowledge among his colleagues and conducted a series of demonstrations, seminars, and work sessions for interested faculty members. Some of the faculty who attended these meetings used the computer as an instructional tool, e.g., to demonstrate limit and convergence in mathematics, for statistical calculations in economics, for numerical solutions of problems in electronics. Participants in the summer 1972 session of PRISE were recruited from among the faculty who had become interested in computing through the meetings held by this participant in the original summer session.

The third faculty participant did not really get his project under way before he left Wilkes College. This was only the first case where attrition was to deplete the ranks of the faculty involved in PRISE.

Some visits by members of Lehigh University's PRISE participants stirred up interest among a few more of our faculty. Seminars and demonstrations in the areas of pattern recognition, econometrics, and simulation were presented by Lehigh faculty members who had successfully applied computing techniques to their academic disciplines. At least one faculty member eventually became active in computing as a result of these visits.

At the completion of the academic year in June, 1972, we

had the beginnings of a reservoir of computing talent. At least eight faculty members had become active users of computing as a direct result of the efforts of the PRISE project group. Other faculty members had expressed an intent to apply computing to their instruction but required help. Three more faculty members were recruited to participate in the June, 1972 session at Lehigh University and in the PRISE activities during the following academic year.

The summer session at Lehigh was attended by five of Wilkes faculty. At this session emphasis was placed on application of the computer in instructional situations. The use of packaged programs for statistical analysis and simulation was particularly stressed, and the participants were given ample opportunity to experiment with the programs that were available.

The summer session closed spectacularly for the Wilkes participants when, on the last day of the session, a flood of the Susquehanna River devastated the Wilkes College campus and the homes of most of the participants. Some of the faculty lost all of their notes and materials, and were unable to continue their participation in PRISE.

For several months following this disaster all of our energies were centered on our personal and institutional recovery operations. Because of the resulting hiatus in our PRISE activities we requested and received from the National Science Foundation a no-cost extension

of the grant period to June, 1974.

An experimental computer-enriched calculus course was conducted by one of the participating faculty. The planning for this course had been completed before the flood so we decided to go ahead with it in spite of the difficulties and delays that confronted us.

The students who attended the calculus course were volunteers from the standard calculus course. These students were taught the fundamentals of BASIC programming and given assignments that included writing programs that involved some of the principles of the calculus. The work may have proved excessive for the average student because less than half of the student volunteers chose to return for the second semester of the course.

A comparison of the grades of the students in the computer enriched course with those in the standard calculus course did not reveal any significant difference in achievement. However, the students who had been introduced to computer programming were found, in some cases, to be applying the computer to problem-solving in other areas of their studies.

Three additional faculty members were trained in the use of the remote terminal and in the fundamentals of programming. Two of these faculty members introduced computing into their classrooms both in problem-solving and demonstration. Unfortunately, one of these faculty members was subsequently lost through attrition.

One of the participating faculty members encouraged some of his students to employ the computer in individual research projects and made the facilities available to them as well as providing supervision and counseling in the area of computing. The projects that the remote computing facility was applied to were chiefly ones whose memory requirements exceeded the capacity of our on-site computer, which is a relatively small scale general purpose computer. One of the students involved was able to delve deeper into the topics of his research (distribution of electrical potentials within shaped cavities) than any prior student in this course had been capable of doing due to the length of the computations involved.

At the close of the academic year (1972-73) another of the PRISE participants left, as well as one of our other faculty members who had been active in computing. At this point we had developed, through PRISE and the efforts of the participants, a core of eight faculty with computing skills, three of whom had left Wilkes. The devastation caused by the flood had a serious effect on the activities of all the faculty and the college as a whole. Computing activities had been assigned a low priority in view of the tremendous recovery tasks of this and the up coming academic year.

Our plans for 1973-74 were scaled down considerably. One of our participating faculty announced her intention of leaving in the near future and another asked to be relieved of his PRISE duties

because of the pressure of flood recovery responsibilities. This left us with one of the original participants, one of the later participants and a handful of faculty members who were actively interested in computing. The only goal we could seriously aim for was the propagation of computing knowledge among a small segment of our faculty. Since our remaining participants were members of the Mathematics and Engineering departments our efforts were concentrated there.

The Computer Center made one of its staff members available as a recource person for any faculty members who required consultation or a guest lecturer. A guide to the bare fundamentals of FORTRAN programming was written to be distributed to faculty and students who required help in getting started in our in-house system. A Computer Center aide was assigned to the faculty as a consultant on the remote computer terminal operations. As in the prior academic year, the faculty participants conducted training sessions for faculty members that had an interest in computing.

During the academic year there was a gradual shift of faculty users from remote, interactive computing to local, batch-mode processing. This happened for two fundamental reasons: (1) the cost of processing on our own small-scale system is less than remote computing, so we encouraged users who did not require extensive memory or interactive capabilities to submit their jobs to our own computer center; (2) many of our users found that the data handling capability of our own system is better for input, storage.

and presentation of their data than that of the remote system. We began to promote the concept of the remote computing system as a supplement to our local system - to be used for the few cases where the requirements of the user preclude the use of the local system.

A change in the composition of the user population also took place during this academic year. Student use of the remote facility predominated over faculty use - due in part to the introduction that the calculus students received during the preceeding year. Students began to request the use of the remote terminal more than they had before, since many of them had discovered its capabilities. A few faculty members were assigning work that could be done with the aid of the remote computer thus encouraging more students to make use of it. The local batch computing facilities remained the mainstay of student computing but selective use of the remote terminal showed that our students were becoming more sophisticated in their application of the computer.

Conclusion

In our efforts to promote the use of computing within our academic programs we encountered two significant problems. One, already mentioned, was the loss of faculty members who had been trained. The other was the loss of interest in computing on the part of many of the remaining faculty members. We found that the additional time and effort required to apply computing techniques to their disciplines discouraged a number of the faculty. They feel that they have too many other duties and interests that are directly related to their disciplines to pursue computing, which is to most of them only an additional technique - a means to an end.

The faculty members whose interest in computing has remained strong seem to have one or more of the following factors going for them: (1) They are able to advance their own research through the use of the computer; (2) they are teaching computer-related topics and this is their main academic interest; or (3) they have talented assistants who can relieve them of the burden associated with applying computing to their academic work.

Another factor that I believe works against the success of any endeavor that requires effort beyond the normal scope of one's duties is the lack of reward or recognition for those who participated in this program. Other investigators have made a similar observation and there is no doubt in my mind that this is equally valid in our case.

Our distance from the host institution, Lehigh University, and the other members of our regional network has created some difficulties. We have not been able to benefit as much as we would like from association with our colleagues at other institutions because of the physical separation. Also, communications costs are greater for us than for other members of the network.

On the positive side, we have built a solid core of computing-oriented faculty members who could not have acquired the training and experience that the PRISE program made available to them if we had to depend entirely on our own resources. The talents of the personnel and the excellence of the facilities that were shared with us would not have been within our reach outside of the regional system.

We still maintain our association with the regional network and enjoy the benefits of having a large-scale computer system available to us when we need it. Although our communication with the other members of the regional network is somewhat limited by the distance we do receive technical assistance from them whenever it is required. It is not only the direct benefits of network membership that have been valuable to us but also the insight into the operation of the network and the experience of sharing facilities with several institutions.

The PRISE program has made it possible for us to introduce interactive computing to our students and provide them with the experience of communicating directly with a computer. Although we are convinced

that a small-scale local computer system is a more economical computing resource, if the workload justifies it, we believe that it is important to introduce our students to an interactive computing environment.